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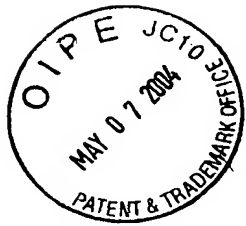
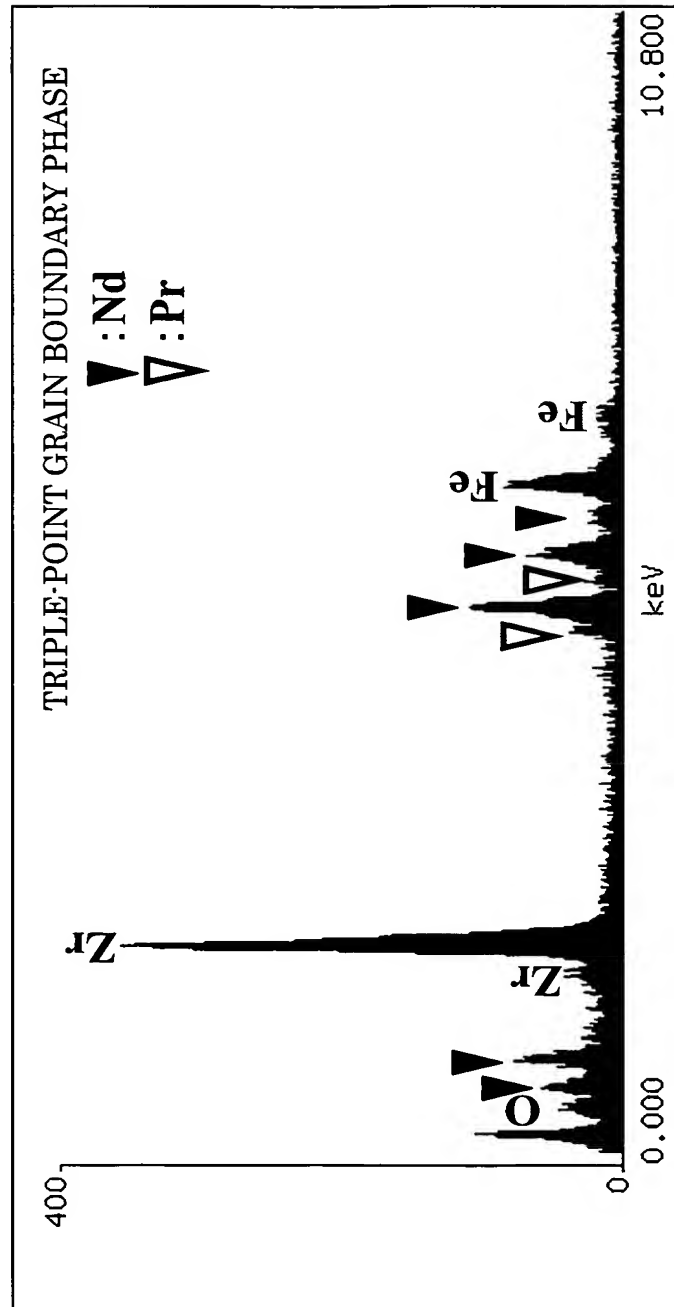
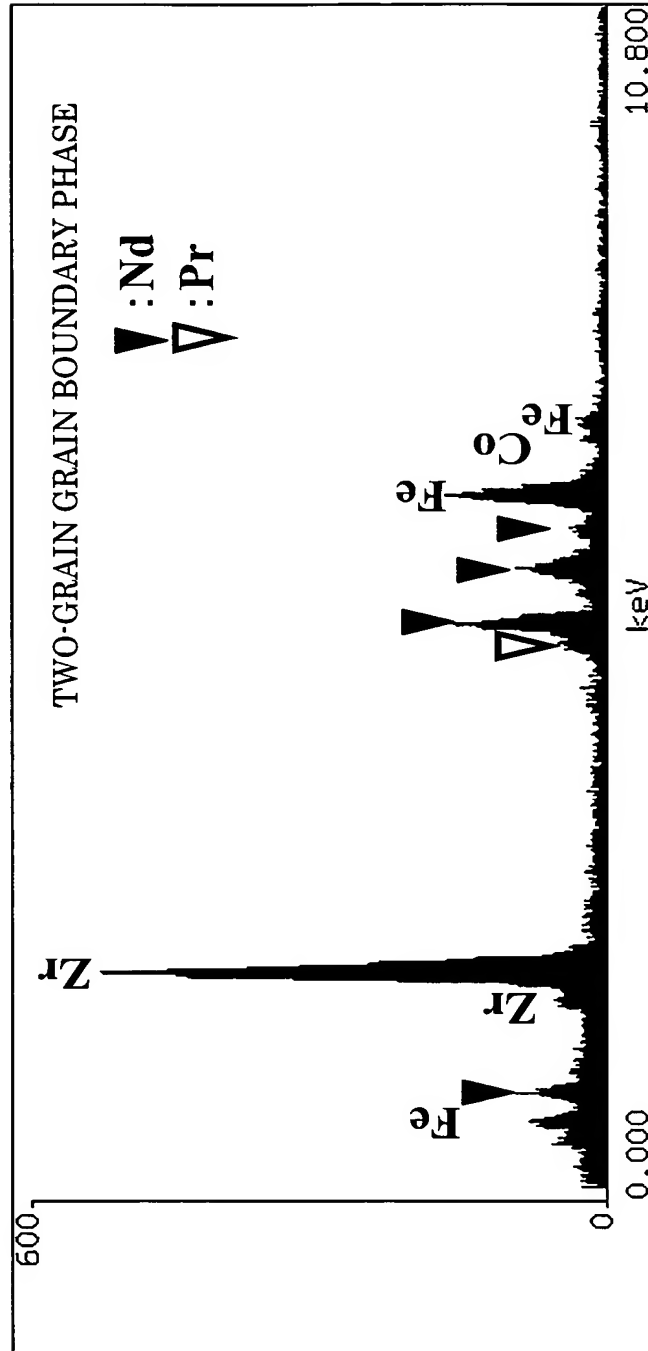


FIG. 1



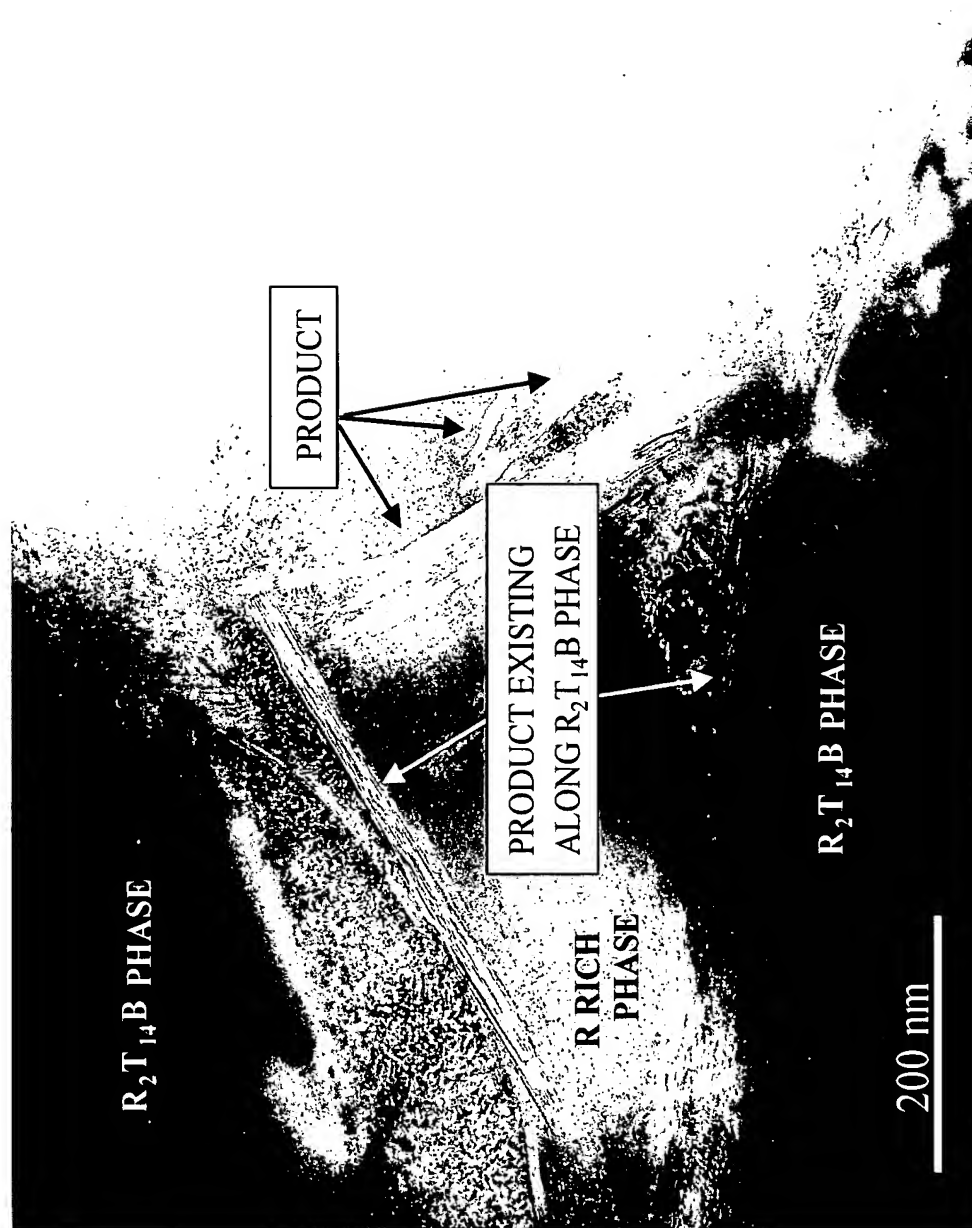
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FIG. 2



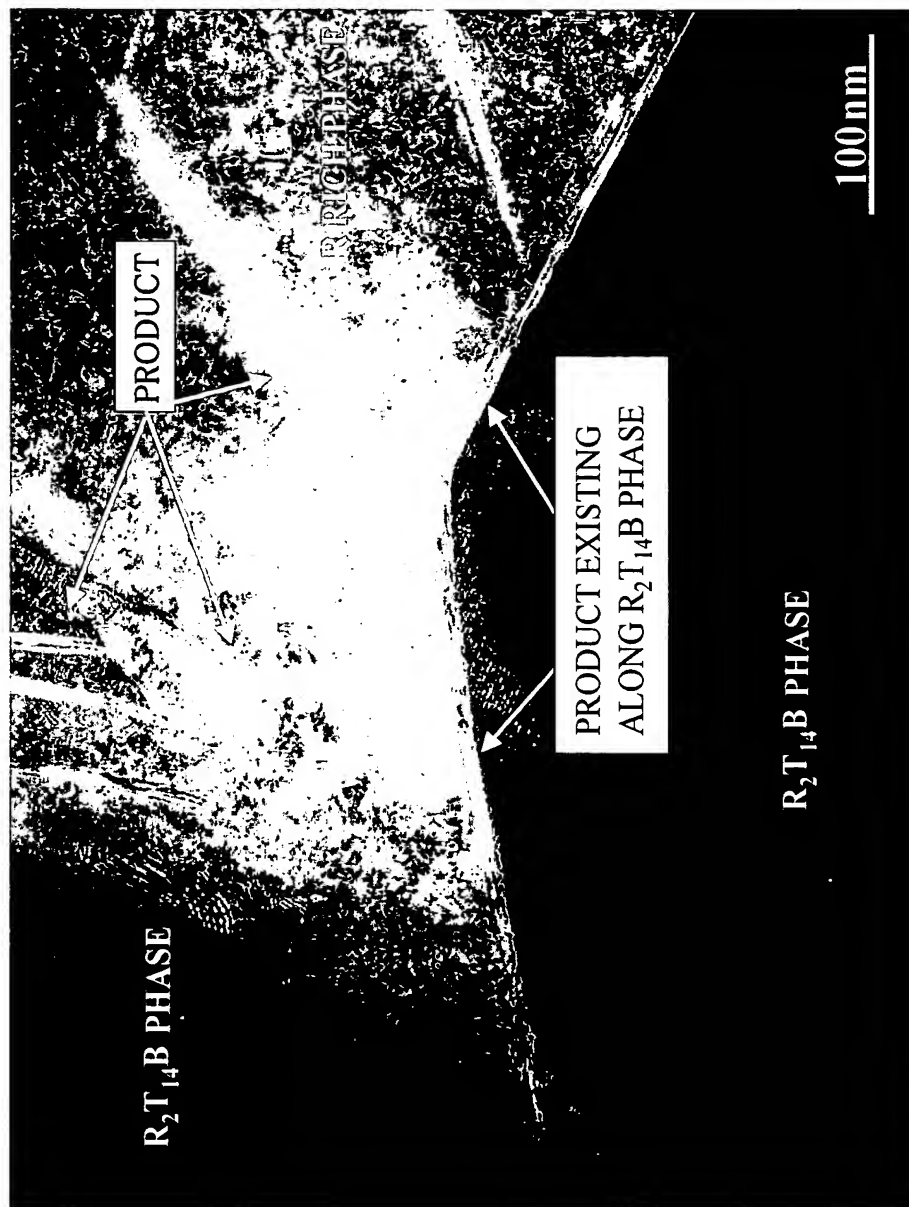
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FIG. 3



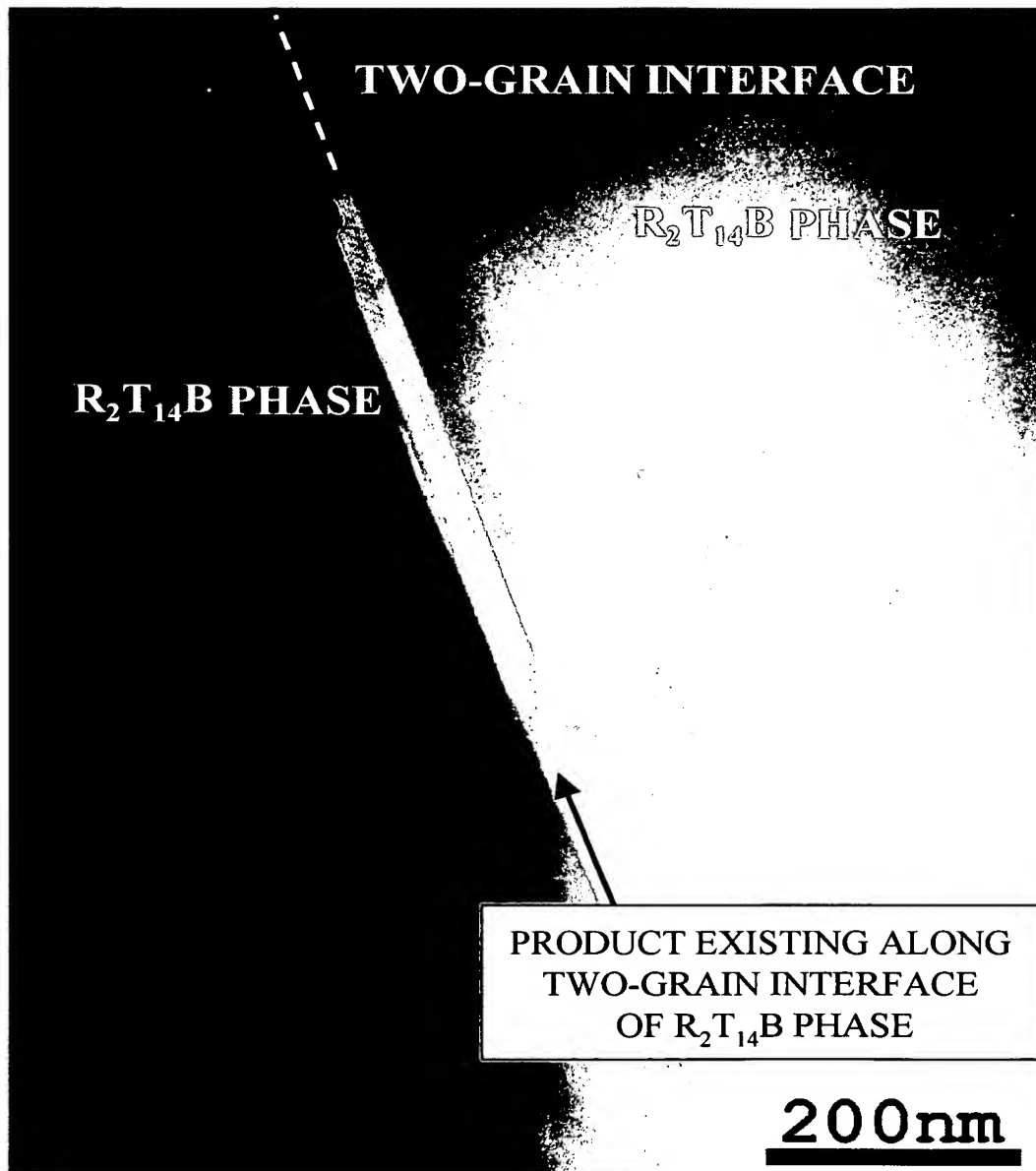
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FIG. 4



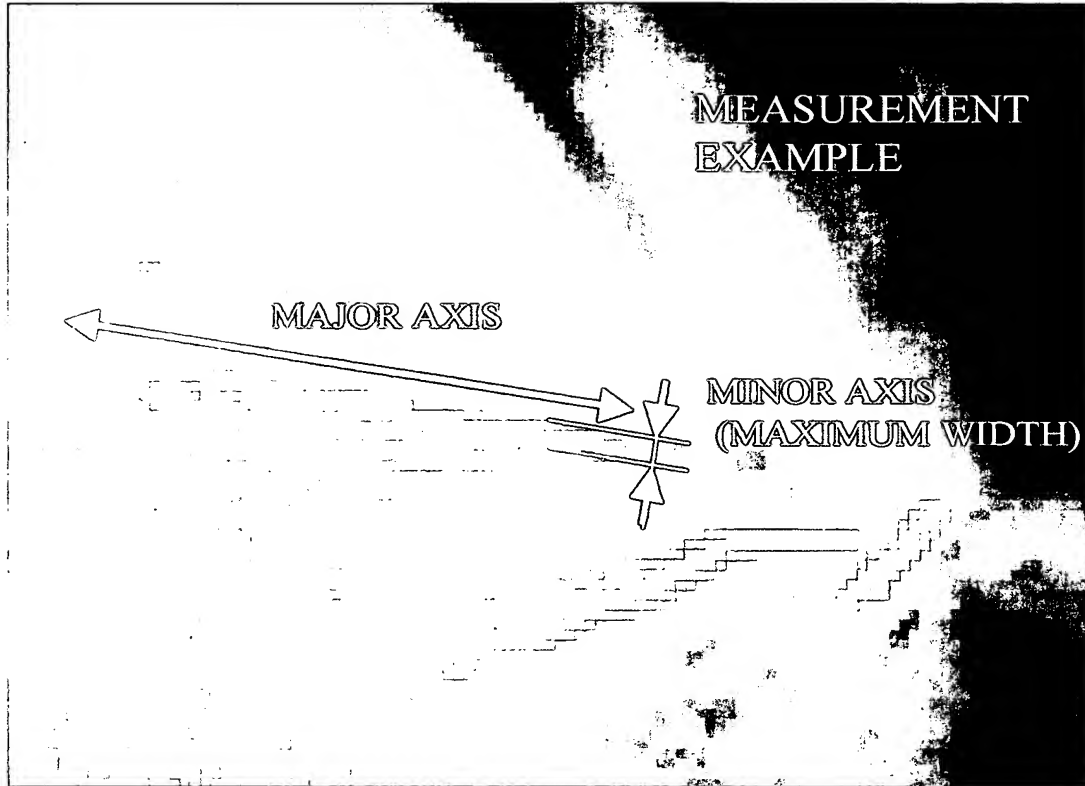
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FIG. 5



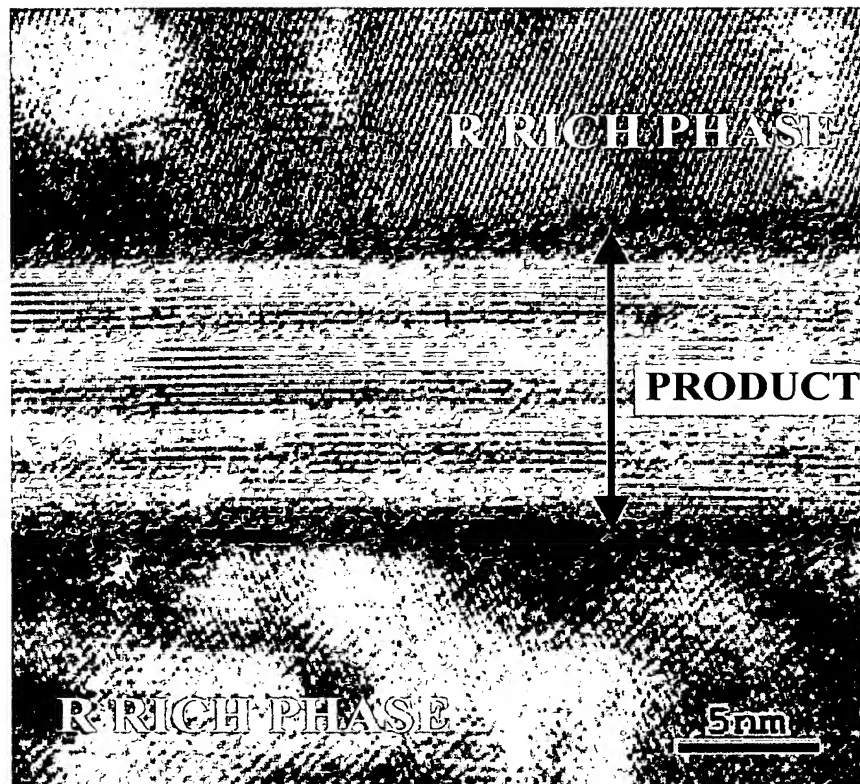
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FIG. 6



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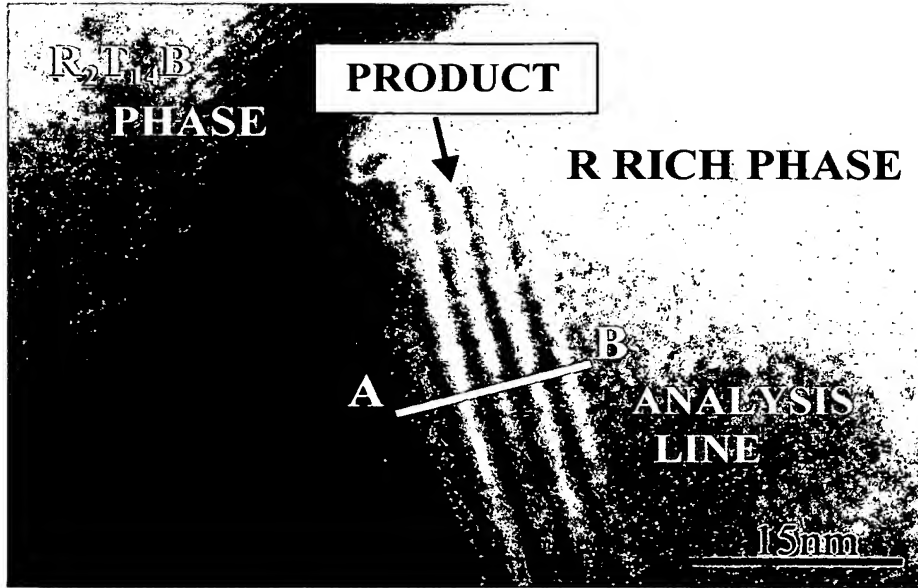
FIG. 7





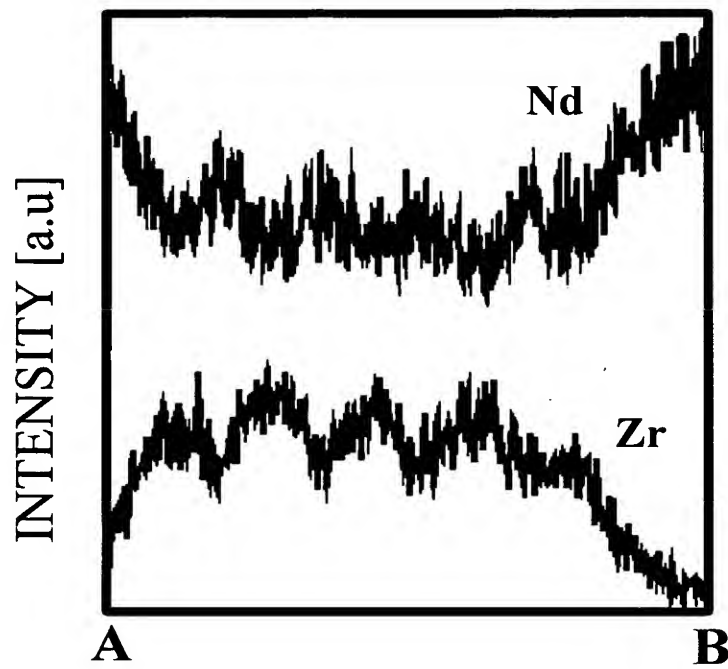
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FIG. 8



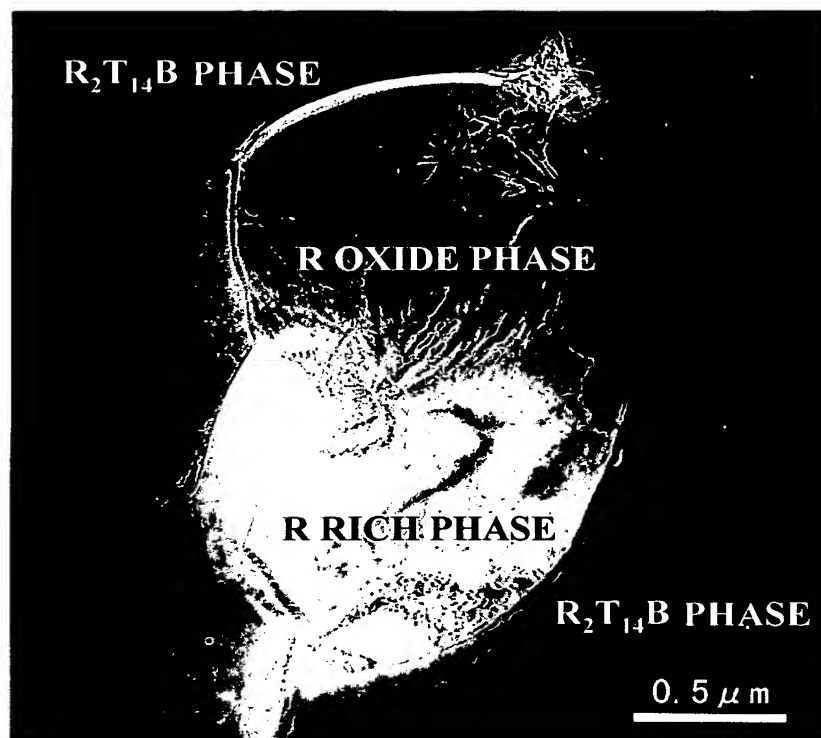
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FIG. 9



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FIG. 10



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FIG. 11

ALLOY a1	LOW R ALLOY	23.6Nd—6Pr—0.3Dy—1.1B—0.05Cu—0.2Al—bal.Fe(wt. %)
ALLOY a2	LOW R ALLOY CONTAINING Zr	23.6Nd—6Pr—0.3Dy—1.1B—0.05Cu—0.2Al—0.32Zr—bal.Fe(wt. %)
ALLOY a3	LOW R ALLOY CONTAINING Zr	15.7Nd—6Pr—8.1Dy—1.1B—0.05Cu—0.2Al—0.15Zr—bal.Fe(wt. %)
ALLOY a4	LOW R ALLOY CONTAINING Zr	23.9Nd—6Pr—1.1B—0.05Cu—0.2Al—0.15Zr—bal.Fe(wt. %)
ALLOY a5	LOW R ALLOY CONTAINING Zr (WITH HIGH Al)	23.6Nd—6Pr—0.3Dy—1.1B—0.05Cu—0.42Al—0.12Zr—bal.Fe(wt. %)
ALLOY a6	LOW R ALLOY CONTAINING Zr (WITHOUT Al)	23.6Nd—6Pr—0.3Dy—1.1B—0.05Cu—0.12Zr—bal.Fe(wt. %)
ALLOY a7	LOW R ALLOY CONTAINING Zr	27.9Nd—0.1Dy—1.1B—0.03Cu—0.05Al—0.08Zr—bal.Fe(wt. %)
ALLOY a8	LOW R ALLOY CONTAINING Zr	23.7Nd—6Pr—0.2Dy—1.6B—0.3Cu—0.25Al—0.3Zr—bal.Fe(wt. %)
ALLOY b1	HIGH R ALLOY (WITHOUT B)	40.6Nd—0.05Cu—5Co—0.2Al—bal.Fe(wt. %)
ALLOY b2	HIGH R ALLOY CONTAINING Zr (WITH B)	40.6Nd—0.5B—0.05Cu—5Co—0.2Al—3.1Zr—bal.Fe(wt. %)
ALLOY b3	HIGH R ALLOY (WITHOUT B AND Al)	40.6Nd—0.05Cu—5Co—bal.Fe(wt. %)
ALLOY b4	HIGH R ALLOY (WITHOUT B)	35.1Nd—0.03Cu—2Co—0.05Al—bal.Fe(wt. %)
ALLOY b5	HIGH R ALLOY (WITHOUT B)	40.6Nd—0.3Cu—20Co—0.25Al—bal.Fe(wt. %)

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FIG. 12

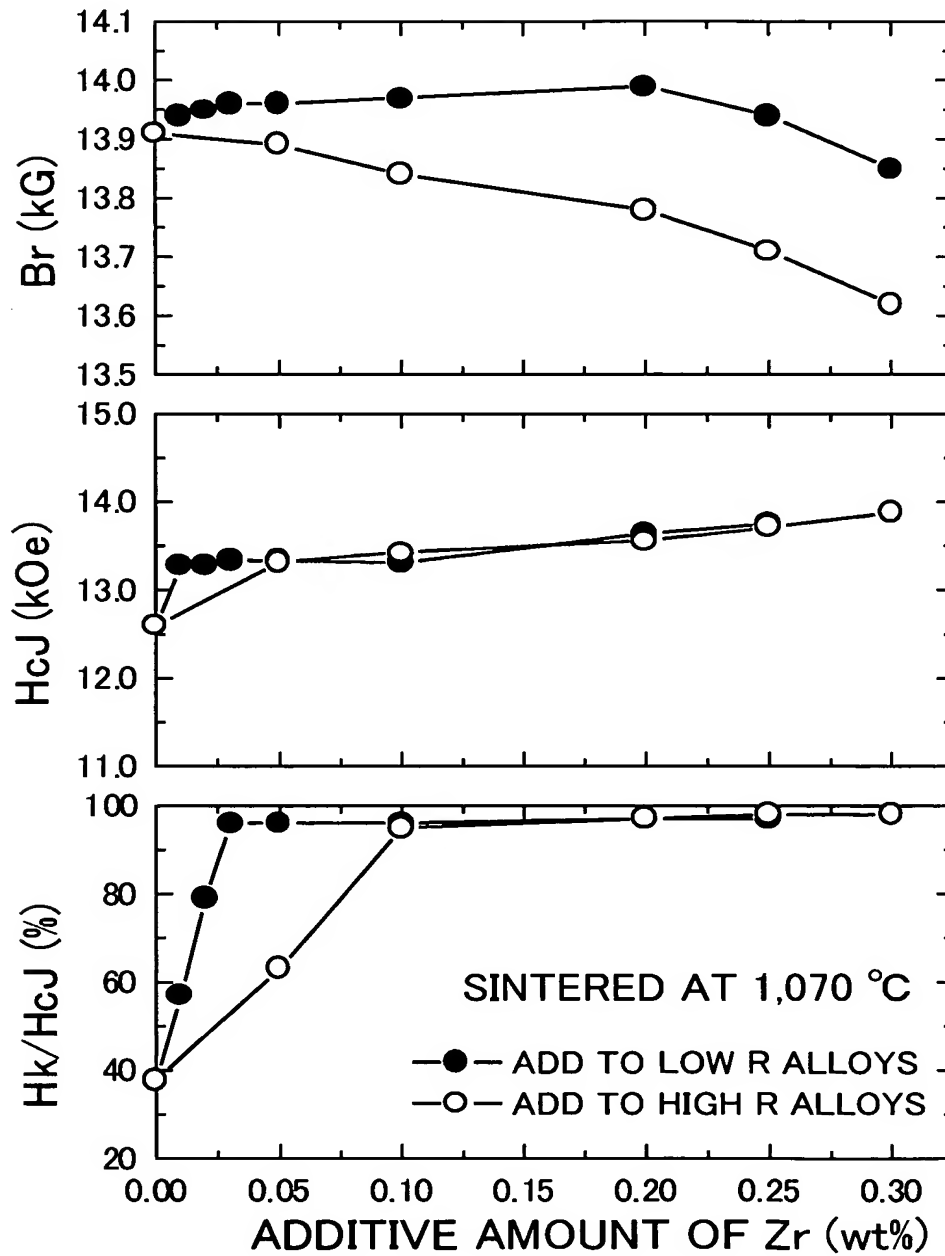
No.	COMPOSITIONS OF SINTERED BODIES(wt. %)	AMOUNT OF OXYGEN (ppm)	LOW R ALLOYS	HIGH R ALLOYS	SINTERING TEMPERATURE	Br (kg)	HcJ (kOe)	Hk/HcJ (%)	Br+0.1 x HcJ	CV VALUE
1	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co	1210	ALLOY a1	ALLOY b1	1070°C	13.91	12.59	38	15.17	-
2	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.01Zr	1290				13.94	13.28	57	15.27	68
3	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.02Zr	1160				13.95	13.29	79	15.28	70
4	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.03Zr	1360				13.96	13.34	96	15.29	66
5	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.05Zr	1090	ALLOY a1 + ALLOY a2	ALLOY b1		13.96	13.33	96	15.29	72
6	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.10Zr	1190				13.97	13.31	96	15.30	78
7	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.20Zr	1110				13.99	13.64	97	15.35	101
8	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.25Zr	1320				13.94	13.75	97	15.32	99
9	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.30Zr	1240				13.85	13.85	98	15.24	110
10	Fe-24.8Nd-5.5Pr-0.3Dy-1B-0.05Cu-0.2Al-0.5Co-0.05Zr	1350				13.89	13.32	63	15.22	159
11	Fe-24.8Nd-5.5Pr-0.3Dy-1B-0.05Cu-0.2Al-0.5Co-0.10Zr	1400				13.84	13.43	95	15.18	214
12	Fe-24.8Nd-5.5Pr-0.3Dy-1B-0.05Cu-0.2Al-0.5Co-0.20Zr	1170	ALLOY a1	ALLOY b1 + ALLOY b2		13.78	13.56	97	15.14	257
13	Fe-24.8Nd-5.5Pr-0.3Dy-1B-0.05Cu-0.2Al-0.5Co-0.25Zr	1220				13.71	13.71	98	15.08	281
14	Fe-24.8Nd-5.5Pr-0.3Dy-1B-0.05Cu-0.2Al-0.5Co-0.30Zr	1310				13.62	13.88	98	15.01	275
15	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co	1888	ALLOY a1	ALLOY b1		13.89	11.44	54	15.03	-
16	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.10Zr	1820	ALLOY a1 + ALLOY a2			13.97	12.33	97	15.20	81
17	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.20Zr	1920				13.98	12.58	97	15.24	98
18	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.25Zr	1870				13.93	12.81	98	15.21	97
19	Fe-24.8Nd-5.5Pr-0.3Dy-1B-0.05Cu-0.2Al-0.5Co-0.10Zr	1800	ALLOY a1	ALLOY b1 + ALLOY b2		13.81	12.39	96	15.05	223
20	Fe-24.8Nd-5.5Pr-0.3Dy-1B-0.05Cu-0.2Al-0.5Co-0.20Zr	1960				13.75	12.55	97	15.01	263

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FIG. 13

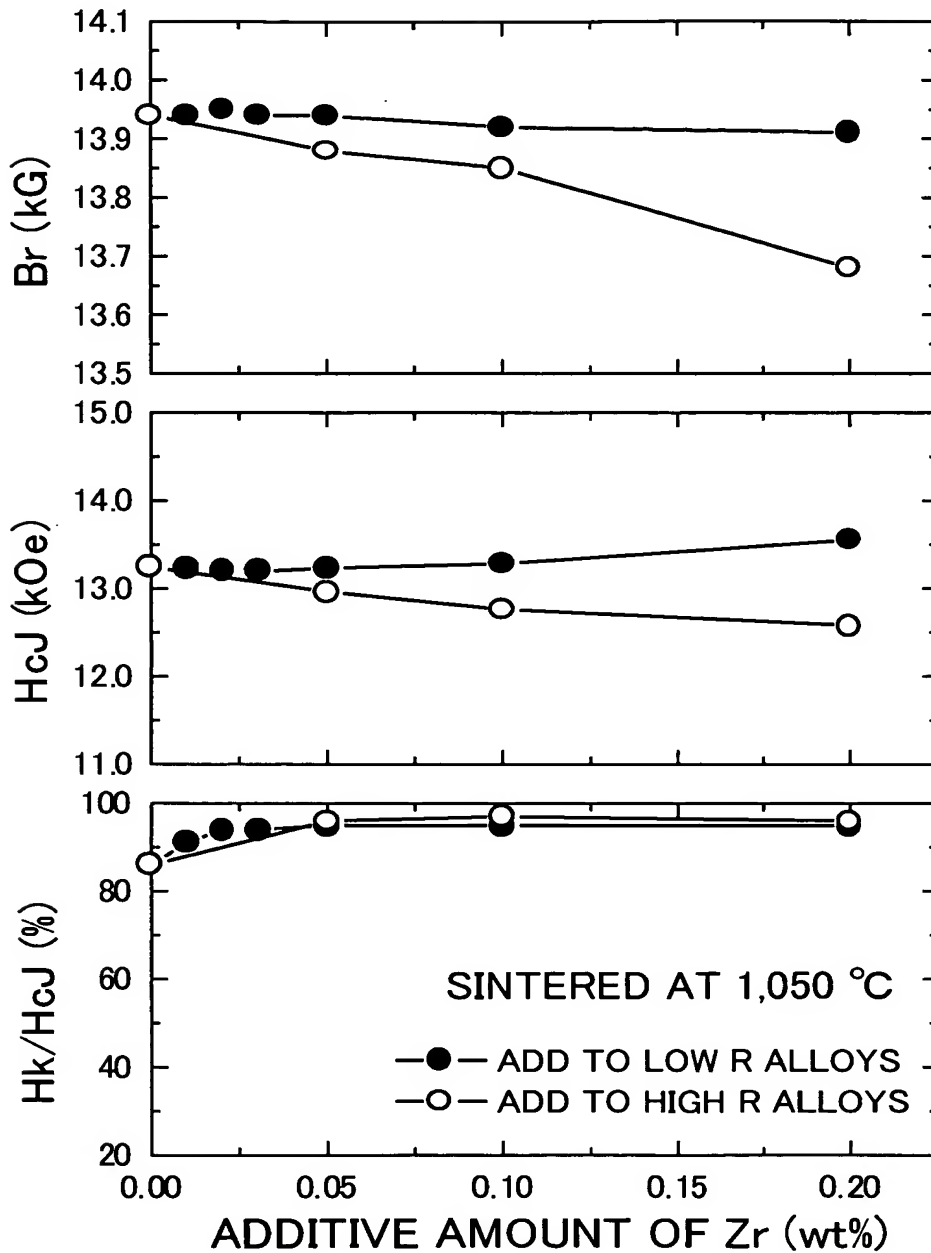
No.	COMPOSITIONS OF SINTERED BODIES(wt. %)	AMOUNT OF OXYGEN (ppm)	LOW R ALLOYS	HIGH R ALLOYS	SINTERING TEMPERA- TURE	Br (kG)	HcJ (kOe)	Hk/HcJ (%)	Br+0.1 x HcJ
21	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co	1210	ALLOY a1	ALLOY b1	1050°C	13.94	13.24	86	15.26
22	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.01Zr	1260	ALLOY a1 + ALLOY a2	ALLOY b1		13.94	13.23	91	15.26
23	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.02Zr	1180				13.95	13.19	94	15.27
24	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.03Zr	1360				13.94	13.19	94	15.26
25	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.05Zr	1110				13.94	13.23	95	15.26
26	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.10Zr	1170				13.94	13.28	95	15.27
27	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.20Zr	1200				13.91	13.55	95	15.27
28	Fe-25.0Nd-5.4Pr-0.3Dy-1B-0.05Cu-0.2Al-0.5Co-0.05Zr	1300	ALLOY a1 + ALLOY b2	ALLOY b1 + ALLOY b2		13.88	12.96	96	15.18
29	Fe-24.8Nd-5.5Pr-0.3Dy-1B-0.05Cu-0.2Al-0.5Co-0.10Zr	1370				13.85	12.76	97	15.13
30	Fe-24.8Nd-5.5Pr-0.3Dy-1B-0.05Cu-0.2Al-0.5Co-0.20Zr	1250				13.68	12.58	98	14.94
31	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.01Al-0.5Co-0.10Zr	1220	ALLOY a5 + ALLOY a6	ALLOY b1 + ALLOY b3		14.15	11.20	95	15.27
32	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.03Al-0.5Co-0.10Zr	1310				14.14	12.49	96	15.39
33	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.05Al-0.5Co-0.10Zr	1140				14.13	12.60	95	15.39
34	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.3Al-0.5Co-0.10Zr	1180				13.87	13.27	97	15.20
35	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.4Al-0.5Co-0.10Zr	1230				13.61	13.00	96	14.91

FIG. 14



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FIG. 15





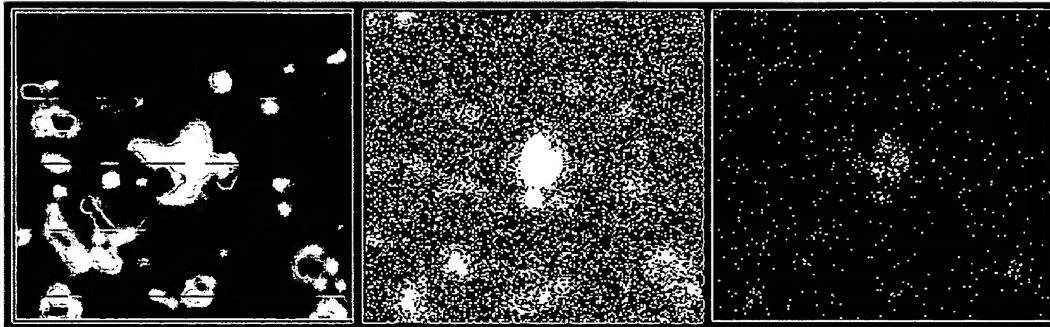
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FIG. 16

COMPOSITION  
IMAGE

Zr

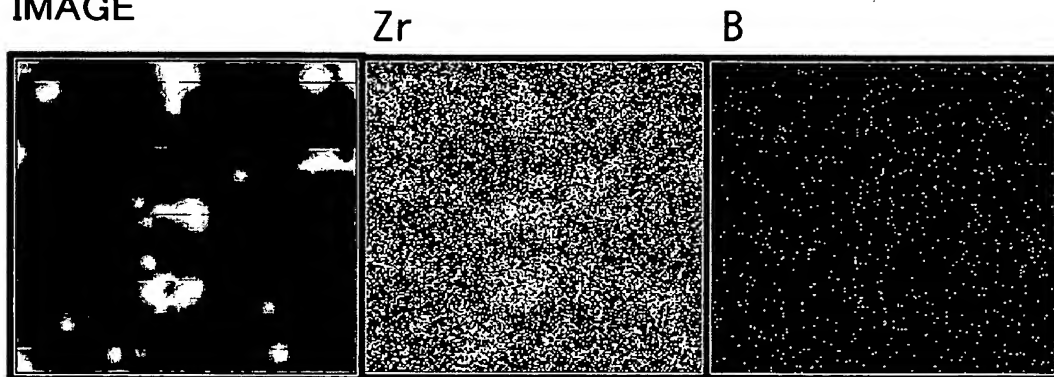
B



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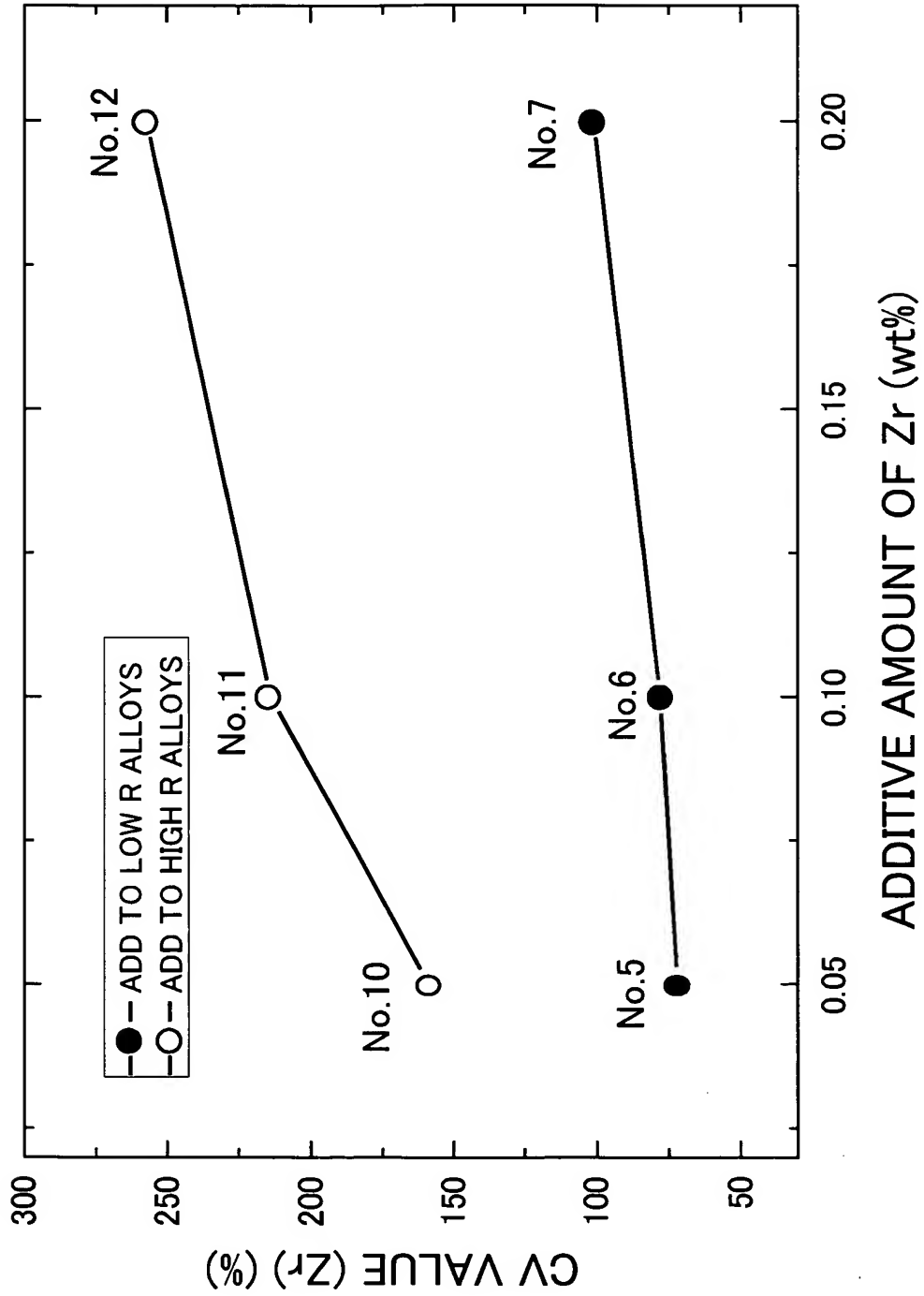
FIG. 17

COMPOSITION  
IMAGE



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FIG. 18



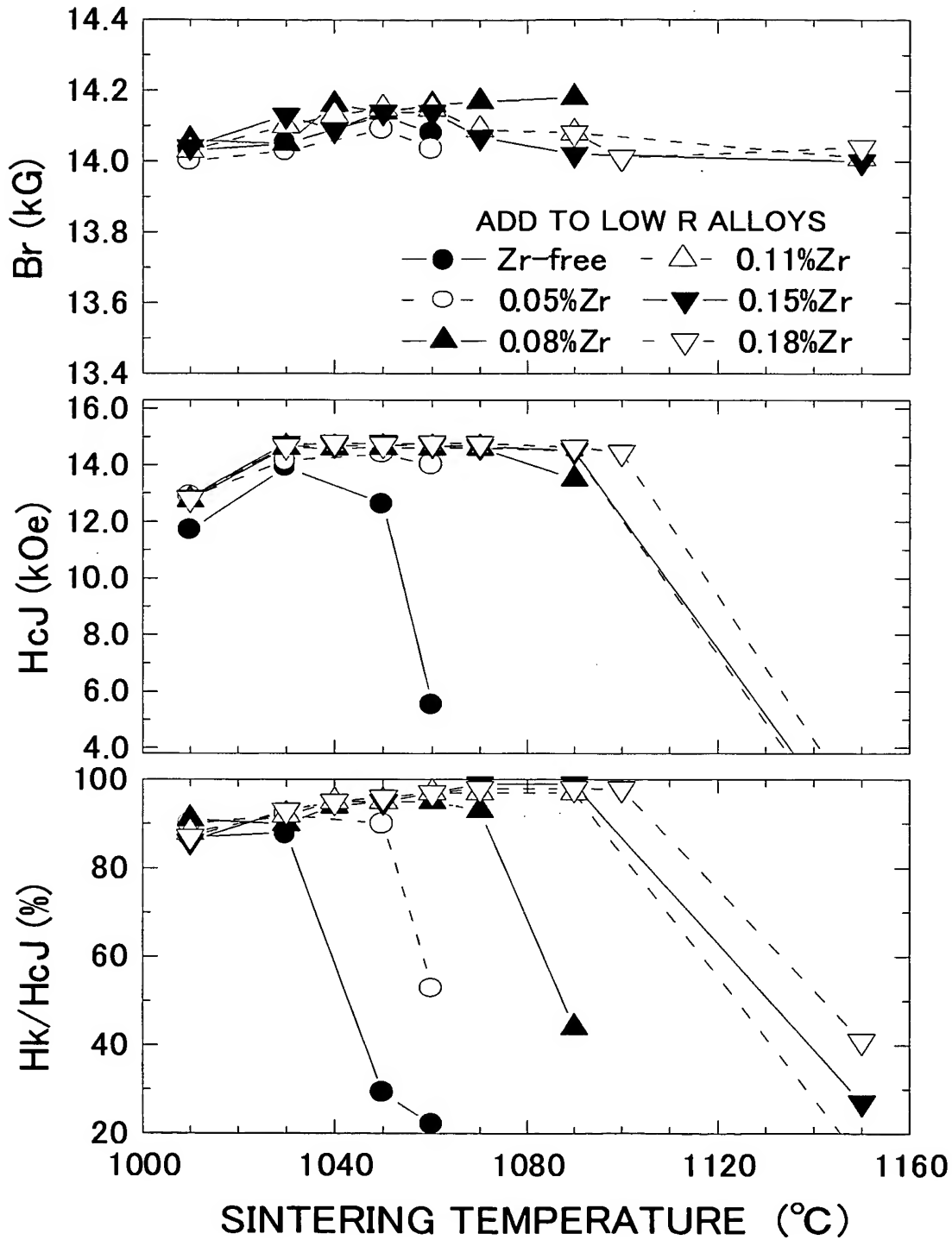
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FIG. 19

No.	COMPOSITIONS OF SINTERED BODIES (wt. %)	AMOUNT OF OXYGEN (ppm)	SINTERING TEMPERATURE	Br (kG)	HcJ (kOe)	Hk/HcJ (%)	Br+0.1 × HcJ	CV VALUE
36	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co	680	1010°C	14.03	11.68	87	15.20	-
37			1030°C	14.05	13.92	88	15.44	-
38			1050°C	14.13	12.64	29	15.39	-
39			1060°C	14.08	5.53	22	14.63	-
40	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.05Zr	670	1010°C	14.00	12.84	90	15.29	-
41			1030°C	14.03	14.17	92	15.44	-
42			1050°C	14.09	14.37	90	15.53	-
43			1060°C	14.04	14.00	53	15.44	-
44	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.08Zr	870	1010°C	14.06	12.76	91	15.33	-
45			1030°C	14.05	14.61	90	15.51	-
46			1040°C	14.16	14.59	94	15.62	-
47			1050°C	14.14	14.61	95	15.60	-
48			1060°C	14.16	14.60	95	15.62	-
49			1070°C	14.17	14.60	93	15.63	-
50			1090°C	14.18	13.51	44	15.53	-
51	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.11Zr	700	1010°C	14.03	12.85	88	15.31	65
52			1030°C	14.10	14.67	92	15.57	71
53			1040°C	14.13	14.66	95	15.59	77
54			1050°C	14.15	14.71	95	15.62	75
55			1060°C	14.15	14.69	97	15.62	72
56			1070°C	14.09	14.61	97	15.55	75
57			1090°C	14.08	14.49	97	15.53	81
58			1150°C	14.01	0.11	14	14.02	142
59	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.15Zr	740	1010°C	14.04	12.85	86	15.32	68
60			1030°C	14.13	14.72	93	15.60	75
61			1040°C	14.09	14.77	95	15.57	72
62			1050°C	14.14	14.79	95	15.62	80
63			1060°C	14.14	14.72	97	15.61	85
64			1070°C	14.07	14.66	99	15.53	88
65			1090°C	14.02	14.51	99	15.47	91
66			1150°C	14.00	0.50	27	14.05	150
67	Fe-24.9Nd-5.4Pr-0.4Dy-1B-0.05Cu-0.2Al-0.5Co-0.18Zr	810	1010°C	13.98	12.81	87	15.26	-
68			1030°C	14.07	14.67	93	15.54	-
69			1040°C	14.13	14.80	95	15.61	-
70			1050°C	14.05	14.72	96	15.52	-
71			1060°C	14.18	14.78	97	15.65	-
72			1070°C	14.03	14.76	98	15.51	-
73			1090°C	14.08	14.63	98	15.54	-
74			1100°C	14.01	14.45	98	15.46	-
75			1150°C	14.04	1.75	41	14.22	-

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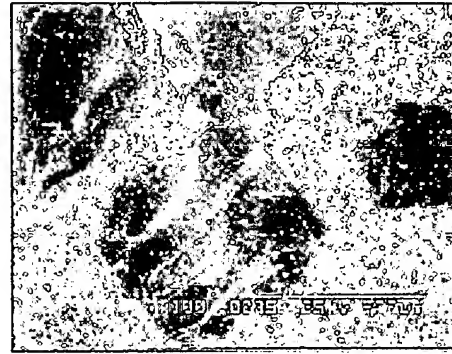
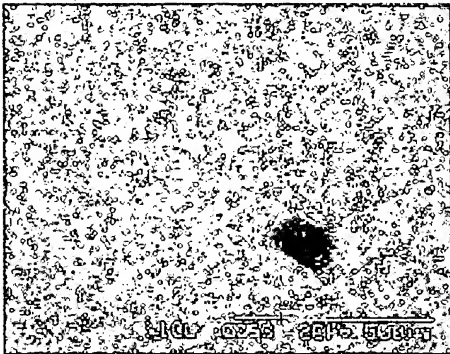
FIG. 20



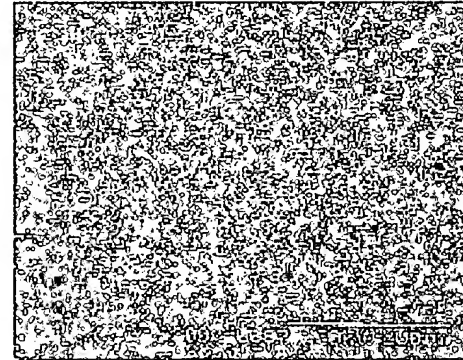
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FIG. 21

(a) No. 37 1030°C Zr-free (b) No. 39 1060°C Zr-free

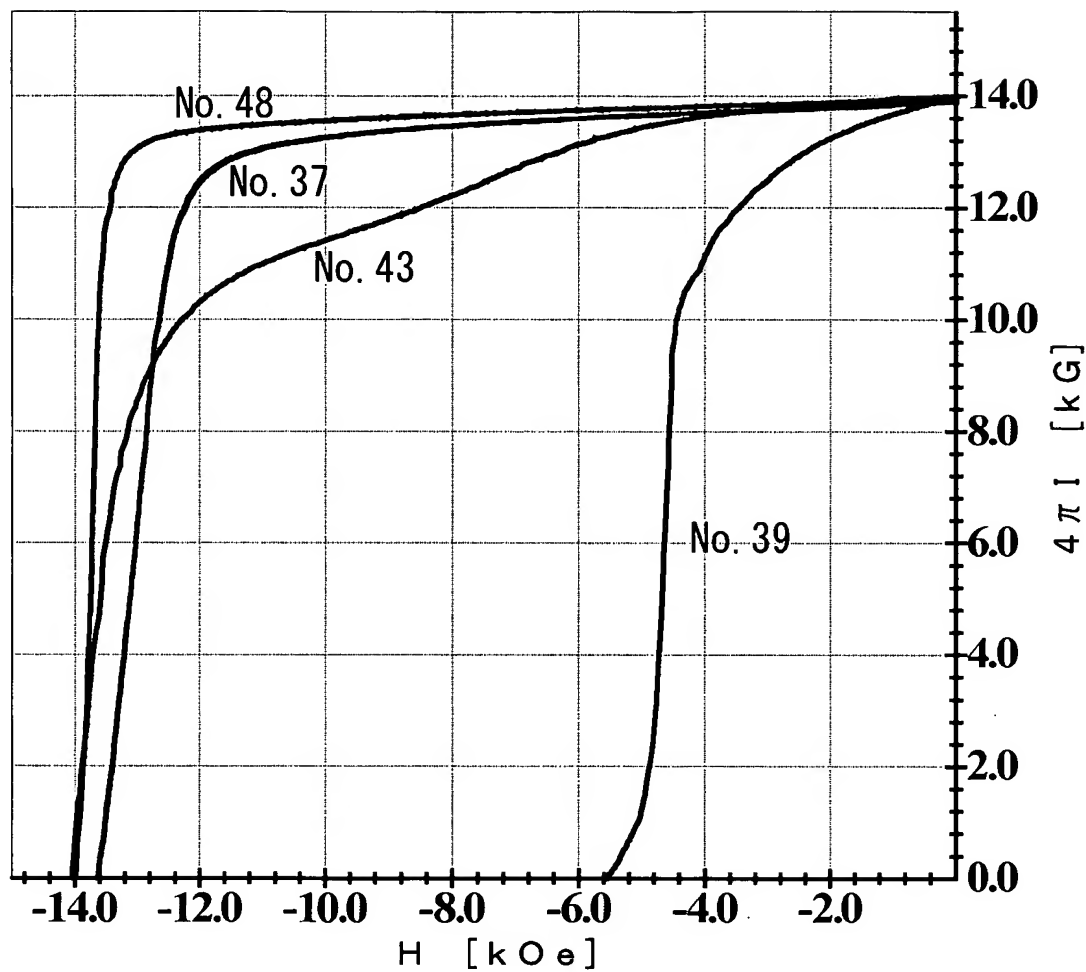


(c) No. 43 1060°C 0.05%Zr (d) No. 48 1060°C 0.08Zr



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FIG. 22



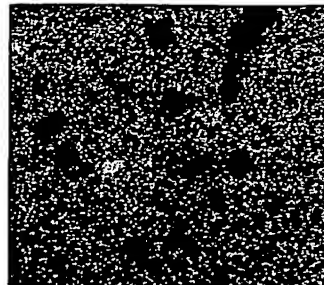
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**FIG. 23**

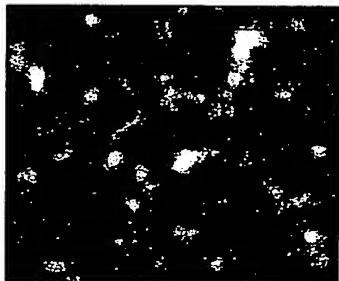
**B**



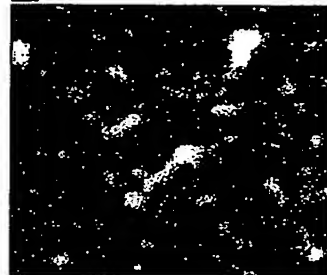
**Al**



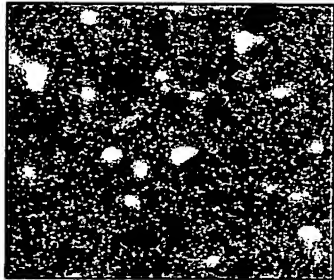
**Cu**



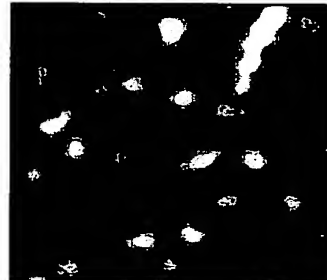
**Zr**



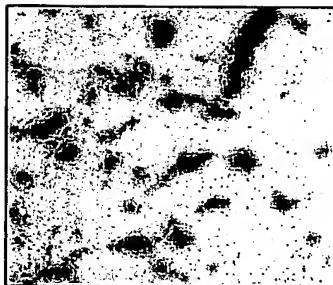
**Co**



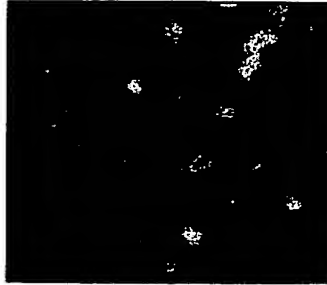
**Nd**



**Fe**



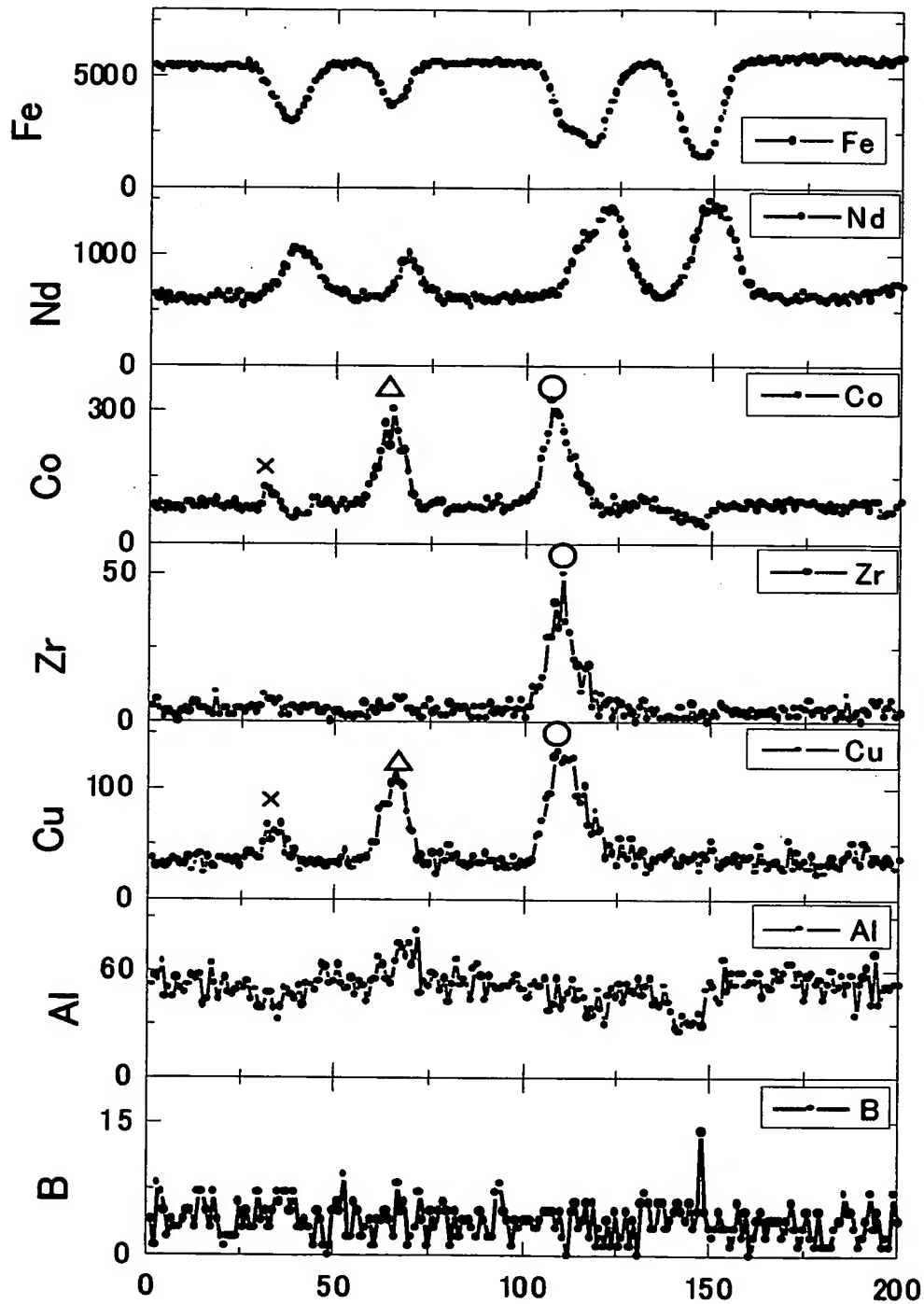
**Pr**





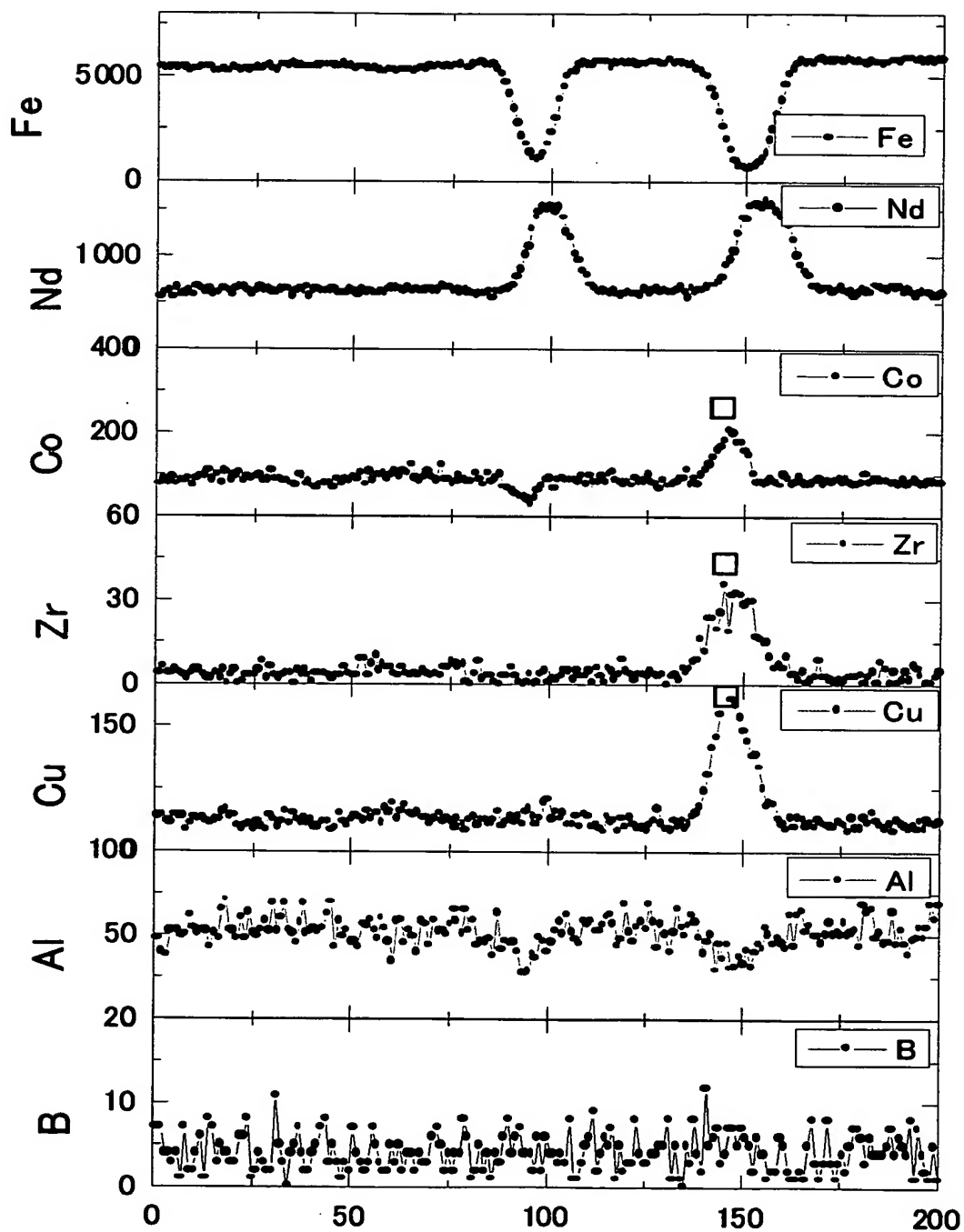
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FIG. 24



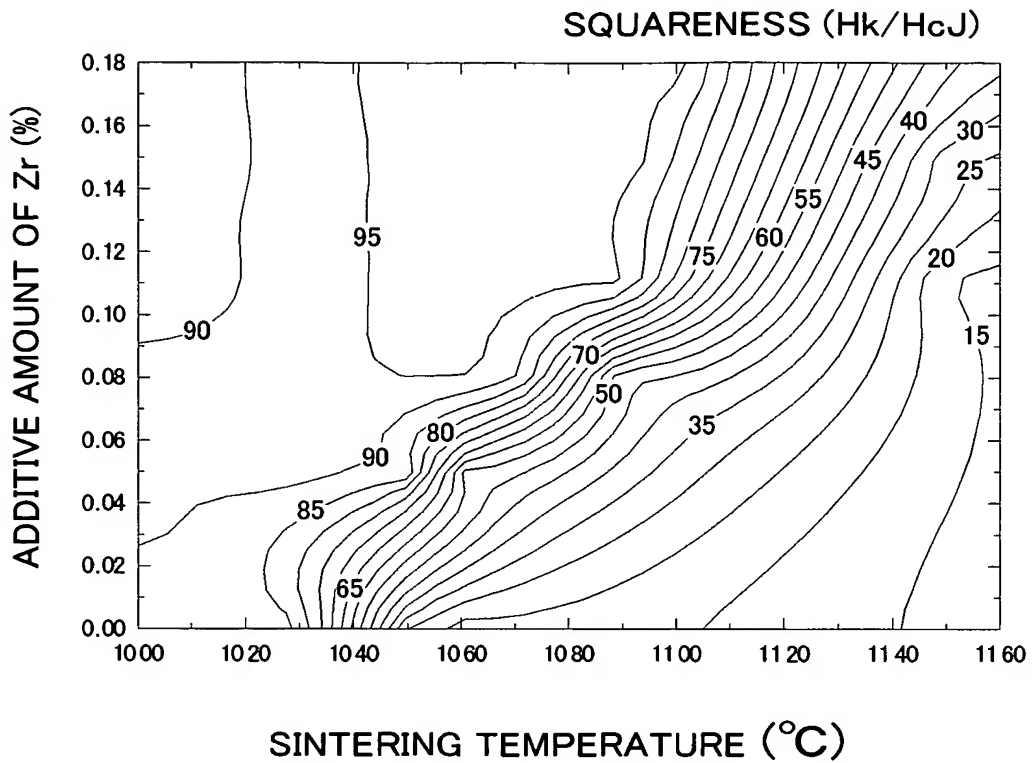
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FIG. 25



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FIG. 26



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FIG. 27

No.	COMPOSITIONS OF SINTERED BODIES(wt. %)	LOW R ALLOYS	HIGH R ALLOYS	SINTERING TEMPERA- TURE	Br (kg)	HcJ (kOe)	Hk/HcJ (%)	Br+0.1 x HcJ
76	Fe-25.0Nd-5.3Pr-1B-0.05Cu-0.2Al-0.5Co-0.13Zr	ALLOY a4	ALLOY b1	1060°C	14.42	12.62	98	15.68
77	Fe-23.2Nd-5.4Pr-2.1Dy-1B-0.05Cu-0.2Al-0.5Co-0.13Zr	ALLOY a1 + ALLOY a2 + ALLOY a3		1070°C	13.68	17.3	97	15.41
78	Fe-20.6Nd-5.4Pr-4.7Dy-1B-0.05Cu-0.2Al-0.5Co-0.13Zr				13.19	23.23	98	15.51
79	Fe-19.0Nd-5.3Pr-7.2Dy-1B-0.05Cu-0.2Al-0.5Co-0.13Zr			1090°C	12.37	30.51	94	15.42

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FIG. 28

TYPE		Nd (wt%)	Pr (wt%)	Dy (wt%)	Co (wt%)	Cu (wt%)	Al (wt%)	B (wt%)	Zr (wt%)	Fe
A	LOW R ALLOY	23.6	6.0	0.3	—	0.05	0.23	1.1	0.11	bal.
	HIGH R ALLOY	40.6	—	—	5.0	0.05	0.23	—	—	bal.
	COMPOSITION OF SINTERED BODY	25.0	5.3	0.3	0.5	0.05	0.23	1.0	0.10	bal.
B	LOW R ALLOY	23.6	6.0	0.3	—	0.05	0.23	1.1	—	bal.
	HIGH R ALLOY	40.6	—	—	5.0	0.05	0.23	0.5	2.0	bal.
	COMPOSITION OF SINTERED BODY	25.0	5.3	0.3	0.5	0.05	0.23	1.1	0.10	bal.

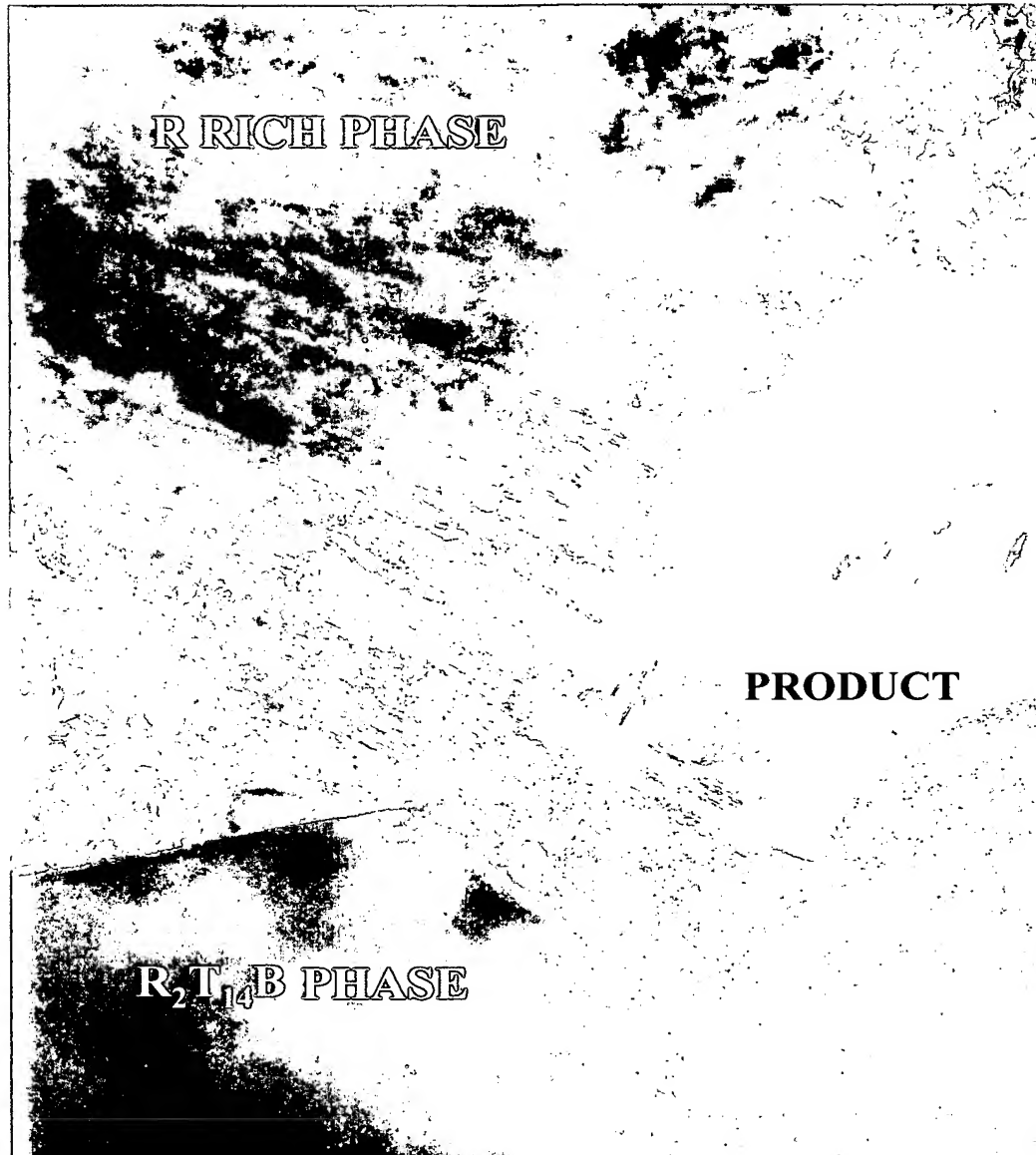
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FIG. 29

TYPE	Zr ADDING METHOD	Zr ADDITIVE AMOUNT [wt%]	O <sub>2</sub> [ppm]	N <sub>2</sub> [ppm]	SIZE OF PRODUCT (AVERAGE)			SINTERING TEMPERATURE [°C]
					MAJOR AXIS [nm]	MINOR AXIS [nm]	AXIS RATIO	
A	LOW R ALLOY	0.1	670	350	310	15	22.7	1050
B	HIGH R ALLOY	0.1	850	300	166	15	11.2	

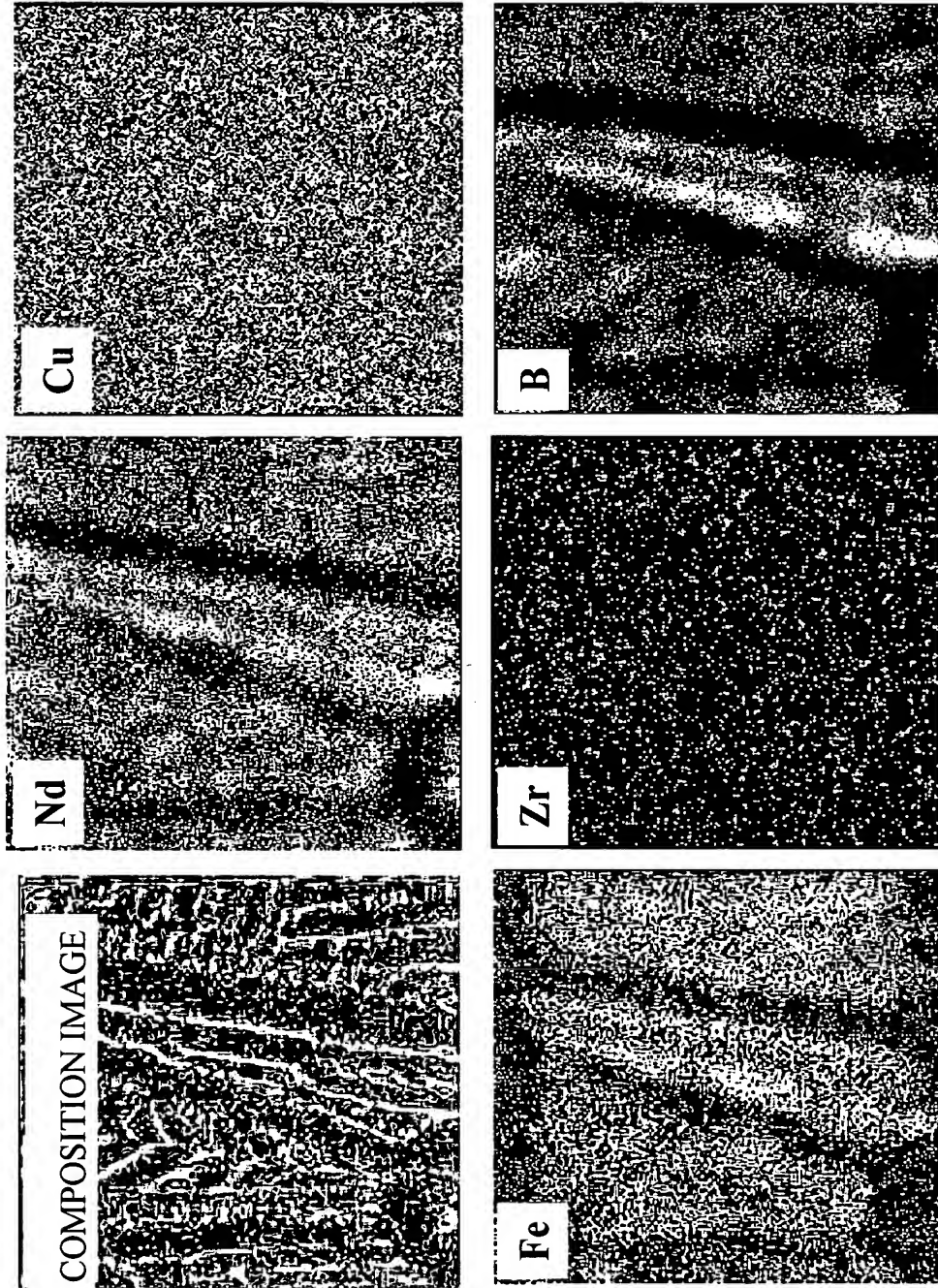
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FIG. 30



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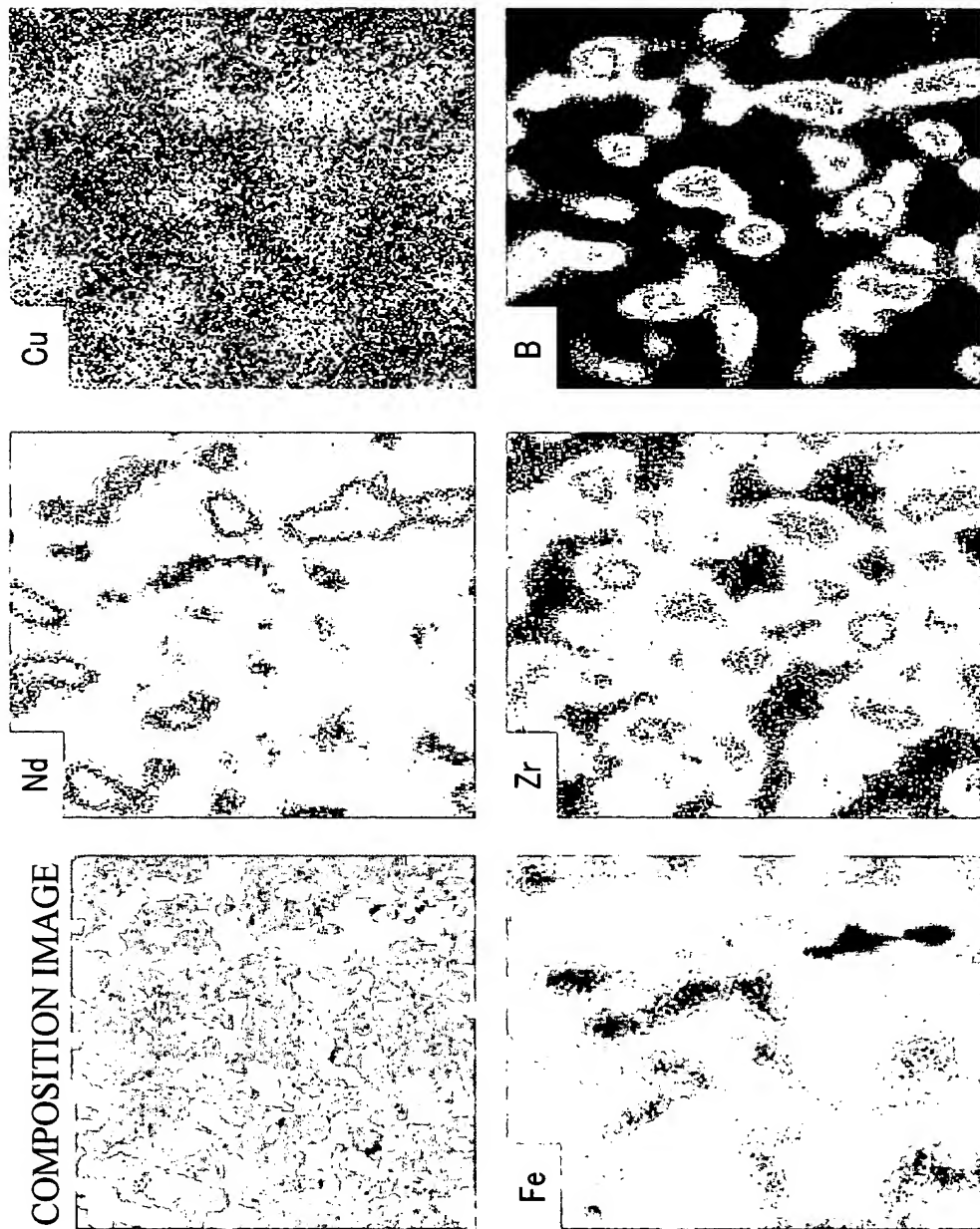
FIG. 31





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FIG. 32



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FIG. 33

No.	COMPOSITIONS OF SINTERED BODIES(wt. %)	AMOUNT OF OXYGEN (ppm)	LOW R ALLOYS	HIGH R ALLOYS	SINTERING TEMPERA- TURE	Br (kg)	HcJ (kOe)	Hk/HcJ (%)	Br+0.1 x HcJ	CV VALUE
80	Fe-28.3Nd-0.1Dy-1B-0.03Cu-0.05Al-0.2Co-0.07Zr	720	ALLOY a7	ALLOY b4	1070°C	14.62	13.1	98	15.93	77
81	Fe-26.9Nd-4.8Pr-0.2Dy-1.3B-0.3Cu-0.25Al-4Co-0.24Zr	980	ALLOY a8	ALLOY b5	1020°C	13.88	15.3	96	15.41	98